

Role-Based And Adaptive User Interface Designs In A Teledermatology Consult System: A Way To Secure And A Way To Enhance

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Abstract -- User interface design is one of the most important parts of developing applications. Nowadays, a quality user interface must not only accommodate interaction between machines and users, but also needs to recognize the differences and provide functionalities for users from role-to-role or even individual-to-individual. With the web-based application of our Teledermatology consult system, the development environment provides us highly useful opportunities to create dynamic user interfaces, which lets us to gain greater access control and has the potential to increase efficiency of the system. We will describe the two models of user interfaces in our system: Role-based and Adaptive.

Implementation -- The Teledermatology consult system is a HIPAA-compliant secure system, developed in an open source environment with Linux, Apache, MySQL, PHP, OpenSSL and accessible through a web interface¹.

Role-based User Interface Model

Protecting patient privacy and compliance with HIPAA regulations has been one of the initial and fundamental design principles. Besides other features we developed for securing the sensitive information, such as Session Control and Audit Trails, the Role-based Access Control (RBAC) has been a key player in our system conception. To implement the RBAC, we designed a Role-based interface Model to present displays and provide functionality appropriate for different role responsibilities.

Through the login authorization, we determine the role for each user. Based on the duties of that role, the system will generate a custom role interface. The interface options allow any particular role to execute the functions to fulfill their duties and also grant the rights to access the appropriate data in the database.

Figure 1 illustrates the access privileges to the Teledermatology Database tables for the three main roles in our system. Nurses from different sites can add, update and retrieve cases only from their own site in the database, but each physician has full privileges to retrieve and comment on every case in the database to which they have been assigned. Only

the administrator role can manage the role assignments in the systems account table.

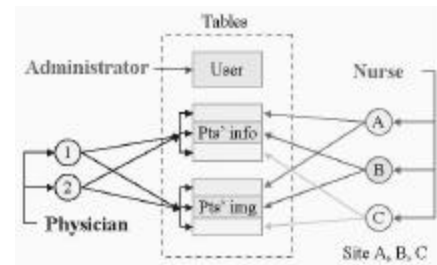


Figure 1. RBAC illustration for accessing tables in the Teledermatology Database.

Adaptive User Interface Model

We are also concerned about how can we improve the usability to the system, how can we improve the efficiency, and how can we make the system more user-friendly? To address these issues, we are now refining an Adaptive Model for modifying the user interface for the function of the physician role that learns individual preferences in selecting drugs for a patients' treatment plan.

The system profiles and analyzes each physician's choice of treatments for various dermatologic conditions, then weight the priorities for each drug, and based on the result, generates drug choice lists in preference order for each physician for different conditions. Using this Adaptive Model, the system adapts its behavior by learning from each user's prescribing patterns, and customizes the presentation order dynamically for each individual user.

With the addition of this new Adaptive User Interface Model, we hope to make the interaction more efficient and more satisfying for dermatologists.

References:

1. Lin, Y. and Speedie, S., An Open Source-based Secure Dermatology Telemedicine Consult System. *Proceedings of the 2001 AMIA Annual Symposium*, November 3-7, Washington, DC, 2001.